

AMENDMENTS TO THE CLAIMS

The following list of claims, in which Applicants amend claim 1, will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently amended) A method for cutting light-conducting fibers, the method comprising the steps of:
 - (a) ~~providing selecting~~ from CO₂ laser radiation a disengaged operative beam comprising individual pulses;
 - (b) selecting the pulse peak power (\hat{P}), the pulse half value duration (τ_{imp}) and the pulse frequency (f_{imp}) such that each pulse ablates one elementary volume of material of a fiber to be cut, one elementary volume being approximately equal to the product of the optical penetration depth into the fiber and the cross-section surface area of the incident operative beam;
 - (~~c~~b) focusing the operative beam on a fixed light-conducting fiber;
 - (~~d~~e) ~~sweeping moving~~ the operative beam back and forth in a plane along a working zone over the fiber, ~~so that wherein each sweep causes ablation of a thin layer of fiber material, the thin layer comprising adjacent elementary volumes of fiber material~~ one elementary volume of fiber material is removed per pulse, wherein one elementary volume is approximately equal to the product of the optical penetration depth into the fiber and the cross-section surface area of the incident operative beam;
 - (~~e~~d) providing a cooling off phase between each back and forth movement of the beam to cool the working zone; and
 - (~~f~~e) repeating steps (~~d~~e) and (~~e~~d) until the light-conducting fiber is completely cut through.
2. (Canceled)
3. (Canceled)

4. (Previously presented) The method of claim 1, wherein the light-conducting fibers comprise different shapes and thicknesses.
5. (Previously presented) The method of claim 1, wherein the light-conducting fibers comprise a fiber bundle.
6. (Previously presented) The method of claim 1, wherein the elementary volume is smaller than 10^{-3} of the total volume of fiber material removed upon a through cut, and the optical penetration depth is small compared to the diameter of the core of the fiber.
7. (Previously presented) The method of claim 1, further comprising the step of blowing a gas on the working zone.
8. (Previously presented) The method of claim 1, wherein the light conducting fibers are selected from the group consisting of mono-mode fibers, multi-mode fibers, gradient fibers, unclad fibers, and clad fibers.
9. (Previously presented) The method of claim 7, wherein the gas comprises purified compressed air at about 1 bar working pressure.
10. (Previously presented) The method of claim 1, wherein the parameters of the operative beam are as follows:
 - Pulse peak power (\hat{P}): $\hat{P} \leq 1\text{kW}$, but at least on the order of W;
 - Pulse period (τ_{imp}): $10^{-5}\text{ s} \leq \tau_{imp} \leq 10^{-4}\text{ s}$; and
 - Pulse repetitive frequency (f_{imp}): $100\text{ Hz} \leq f_{imp} \leq \text{a plurality of kHz}$.
11. (Previously presented) The method of claim 1, wherein the cooling off phase is from about 10 ms to about 100 ms.
12. (Previously presented) The method of claim 1, wherein the method produces a cut surface at a right angle to the axis of the fiber.
13. (Previously presented) The method of claim 1, wherein the method produces a cut surface at an inclined angle to the axis of the fiber.

14. (Previously presented) The method of claim 1, wherein the Rayleigh length (Z_R) of the focused beam is greater than the total diameter of the fiber.
15. (Previously presented) The method of claim 1, wherein the diameter of the incident operative beam ranges between about equal to the diameter of the focus spot (d_f) and less than twice the diameter of the focus spot (d_f).